Abstract Submission for the 11th INTERNATIONAL MEETING on STATISTICAL CLIMATOLOGY

Session: Evaluation and uncertainty estimation from multimodel and perturbed physics ensembles (Reto Knutti, ETHZ)

Title: When is a model relevant?

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Many if not most of the questions stated in this session's description assume that at least one model in hand (e.g. one model in the ensemble of models being analyzed) is adequate for quantitative predictive purposes of interest. This assumption is investigated. How might we tell whether a collection of models (a) consists entirely of models that are inadequate for purpose, (b) includes one, or a few, adequate models amongst many inadequate models, or (c) consists entirely of models that are adequate for purposes of interest?

A key distinction is made between a "best" model and a "decision-relevant" model, and the question is asked whether today's best model is indeed relevant for quantitative decision support, or is better used "merely" for insight and understanding. We consider lessons learned in actual applications of medium-range weather forecasts and of seasonal forecasts to decision support questions. Fundamental differences between these weather-like applications and decision support in the context of climate change are stressed; these differences include distinguishing interpolation and extrapolation, and the need to evaluate a model and its climate distributions given only a single realization of the system's weather time series under transient forcing.

Avenues for scientific support of policy and decision making in the case where state-of-the-art models best provide insight and understanding, thereby underpinning the science and exposing unknown risks and processes, are considered. The design and interpretation of multi-model and perturbed physics experiments are examined in this light, and questions posed in the session description are recast.